

Chapter 12

Voyage Planning

Introduction

In this chapter we will discuss one of the most important aspects of navigation; voyage planning. Every successful voyage starts with a well thought out plan. We will cover all details of developing a plan that will enable you to have a successful voyage.

Objectives

The material in this chapter will enable the student to:

- Plan and construct great-circle tracks.
 - Plan and construct coastal tracks.
 - Plan and construct restricted water tracks.
 - Plan and construct precision anchorages.
 - Plan for deployments.
 - Plan and construct navigation briefs.
 - Prepare to enter or depart port.
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Planning and Constructing Great-Circle Tracks

Considerations

The navigator (NAV) and assistant navigator (ANAV) must lay out the ship's complete intended track on the proper chart format. This task is undertaken after the planning stage is complete but several days or weeks before getting under way, depending on the length of cruise.

If your track will be less than 300 nautical miles, a small-scale Mercator chart will be adequate. However, for those tracks exceeding 300 nautical miles, you will probably use the gnomonic or great-circle chart. There may be some cruises longer than 300 nautical miles where a Mercator or other type of chart is more appropriate than the great-circle chart.

You will recall from chapter 1 the shortest distance between two points is a straight line. A straight line is perfect for navigational track planning using a great-circle chart (gnomonic projection).

The Defense Mapping Agency (DMA) publishes a number of charts, at various scales, using the gnomonic projection and covering the usually navigated portions of Earth. These are listed in the DMA *Catalog of Maps, Charts, and Related Products*, part 2, volume X. The point of tangency is chosen for each chart to give the least distortion for the area to be covered. On this type of chart, a great circle appears as a straight line. Because of this property, the chart is useful in great-circle sailing.

The following table shows the different stages of constructing a great-circle track:

Stage	Description
1.	Select a great-circle chart that has a point of tangency nearest your ship's predicted track.
2.	Draw the track and check for dangers (consult sailing directions).
3.	Transfer to open ocean Mercator charts (plotting sheets).
4.	Label all departure points.
5.	Determine SOA and lay out PIM.

Planning and Constructing Great-Circle Tracks, Continued

Track Construction

Use the following step action table to construct a great-circle track:

Step	Action
1.	Plot the departure and arrival points on the gnomonic chart projection.
2.	Draw a line between the two points (see fig. 12-1).
3.	Inspect the track to make sure that it does not cross any dangers. Redraw if necessary. Note: If the track must be redrawn, always do so on the gnomonic chart. This will have less impact on overall mileage than navigating around dangers on a Mercator chart.
4.	Select convenient points to use to transfer the track to small scale Mercator charts. Normally these points should be about 300 nmi apart; refer again to figure 12-1.
5.	Label the points beginning with the letter A.
6.	Extract and record the latitude and longitude of each point. This information can be used later for the movement report (MOVREP).
7.	Transfer the points to small scale Mercator charts (fig. 12-2) to show the entire transit. Transfer the points to larger scale Mercator charts that cover about one leg of the transit each. Example: Transfer points A and B on the first Mercator chart selected; transfer points B and C on the second Mercator chart selected; and so on.
8.	Label the track with course and distance for that leg.
9.	Go to steps 7 and 8 until all legs of the track have been transferred and labeled. Now the last stage is to lay out PIM. Move on to page 5.

Planning and Constructing Great-Circle Tracks, Continued

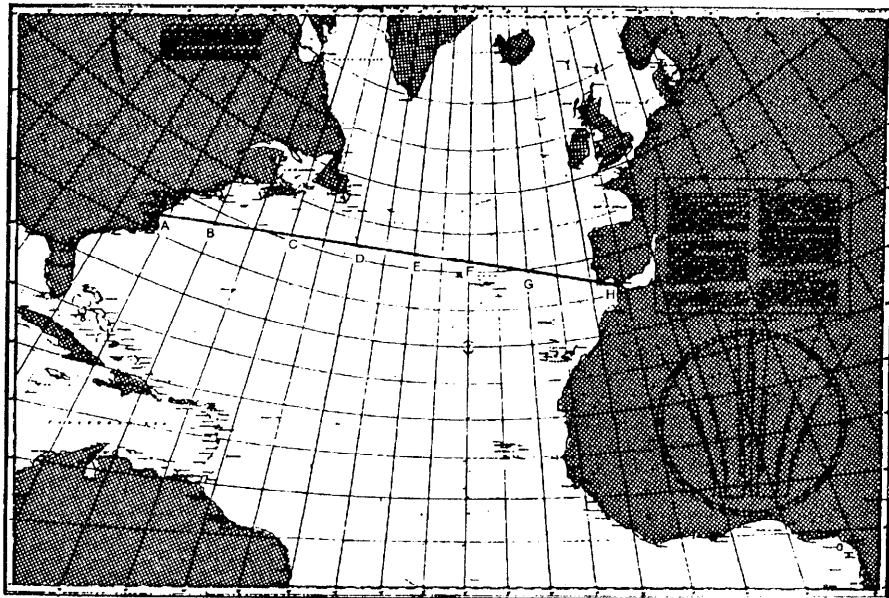


Figure 12-1. Great-circle route; Norfolk to Gibraltar.

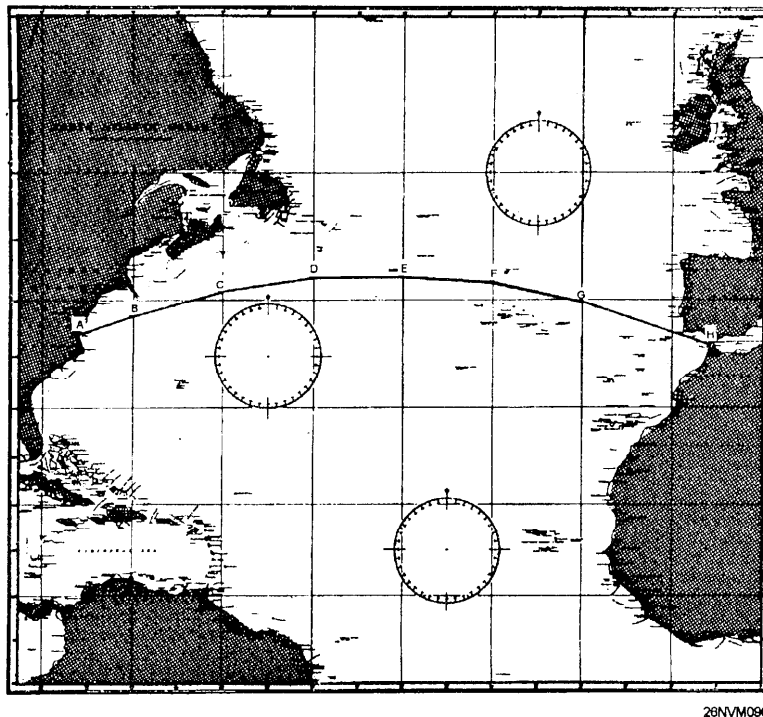


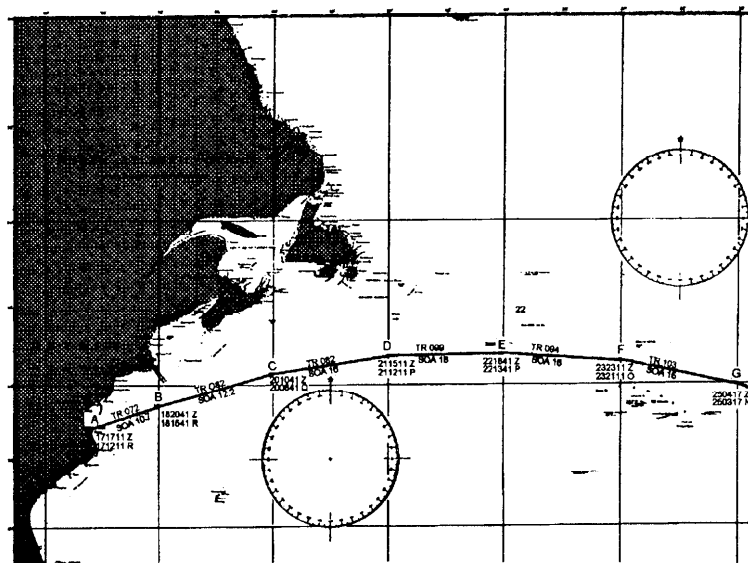
Figure 12-2. Rhumb line approximation to the great-circle track.

Planning and Constructing Great-Circle Tracks, Continued

PIM

At this point in track construction, we have done everything except determine PIM. Use the following step action table to determine PIM and label the track. As an example, we will assume that the ship departs at 10SEP1200Z and arrives at the straits of Gibraltar on 19SEP0700Z.

Step	Action
1.	Find the total hours available for the transit. $19\ 0700 = 18\ 3100$ $\underline{10\ 1200}\quad \underline{10\ 1200}$ $8\ 1900 = 8\ \text{days} \times 24\text{h} + 19\text{h}$ or 211 hours
2.	Add together all rhumb line distances between points A through H. For our example, we'll assume this to be 2247.5 nmi.
3.	Determine the overall SOA. $2247.5\ \text{nmi} \div 211\ \text{hours} = 10.65\text{kn}$. Always round up to the nearest 1/10 of a knot. SOA = 10.7
4.	Begin with the departure point and lay out PIM times and date in GMT for every 4 hours of transit time. Also label the time of departure from each individual point. At this point we have completed our track construction. As an aid to tracking the ship's progress it is highly recommended that the track also be transferred to a small scale chart, as shown in figure 12-3.



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Figure 12-3. Segment of overall track.

Planning and Constructing Coastal Tracks

Considerations

There is a great difference between planning coastal tracks and great-circle tracks. Coastal tracks often require more attention to dangers and shoals. Normally coastal navigation may be defined as any ship operating within 50 nmi of a coastline. Often there are many shoals or dangers which must be avoided. Let's look at a real world example.

Ships departing Norfolk for southern OPAREAs often depart the traffic separation scheme of Chesapeake Bay and steer on a SE heading. Careful attention must be paid to this route due to shallow water and submerged obstructions up to about 25 nmi from the coast in many places. Also, hazards to navigation when turning south around Cape Hatteras are too numerous to mention.

The point of this discussion is to make clear the dangers of coastal navigation. The following rules apply to coastal track construction.

Rules:

- Always review all applicable coast pilots and sailing directions before laying down tracks
- Check the proposed track thoroughly for dangers. Never allow the track to pass within 5 nmi of any danger.
- Highlight all coastal aids to navigation
- Highlight any shoals, towers, OADS buoys, or other obstructions.
- Use the best scale of chart available for any area the ship transits.

Use the following table to construct coastal tracks:

Step	Action
1.	Choose points from a small scale mercator chart that covers the entire area the ship will transit. Draw lines for tracks and label.
2.	Transfer track to the best scale coastal charts available.
3.	Check each leg of the transit for dangers.
4.	Determine SOA and label each chart with PIM.
5.	Apply all rules making sure to highlight shoal water, dangers, and NAVAIDs.

Planning and Constructing Restricted Water Tracks

Gathering Information

The most critical track the QM will construct is the restricted water track. This is because the ship is at its most vulnerable time when transiting dangerous channels. You must plan for all contingencies. It seems that Murphy's law applies most often when a ship is in a channel.

Chart selection: Professional and thorough chart selection and preparation is the foundation on which safe piloting through restricted water tracks is based.

Effective chart selection requires a combination of skill and judgment. Here are some questions to consider when selecting charts for restricted water tracks.

Has the best scale chart been selected for the given area?

Have conspicuous NAVAIDs been lost due to choosing the largest scale chart available?

Are the latest editions of selected charts available?

Research: During the research phase, all reference material on the port should be consulted and notes made. Often port directories and fleet guides will provide invaluable data concerning entering or departing a given port. Often information concerning best approaches, traffic separation schemes, tidal currents, berths available, channel depths, and so on are listed.

Taking detailed notes on this information will speed the process of constructing the restricted water tracks. Once you have gathered information about the port and selected the charts to use, you can start the actual laying down of tracks.

Before you can lay down the actual tracks, you'll have to learn about red and yellow soundings, turn bearings, highlighting dangers, and danger bearings and angles.

Planning and Constructing Restricted Water Tracks, Continued

Red and Yellow Soundings

Red soundings are defined as the minimum depth beneath the keel that the CO deems acceptable. For example, the CO may desire that the ship's draft + 3 feet equal the value for red soundings. For a ship with a draft of 30', the red sounding would equal 33'. This means that at no time may the ship enter water with a depth of less than 33'

Yellow soundings are defined as the depth beneath the keel that indicates potential danger. This depth is also determined by the CO. It may be the ship's draft + 6 feet.

Red and yellow soundings are marked on the chart using a fine felt tip marker of the correct color (red or yellow). After studying the charted depths, freehand draw the red and yellow soundings limits. The result will yield a red or yellow line similar to a fathom curve.

Highlighting NAVAIDS

All prominent NAVAIDS must be highlighted in yellow. This includes any radar navigation points that are selected for use. Radar points should be labeled beginning with the letter A in the direction of travel.

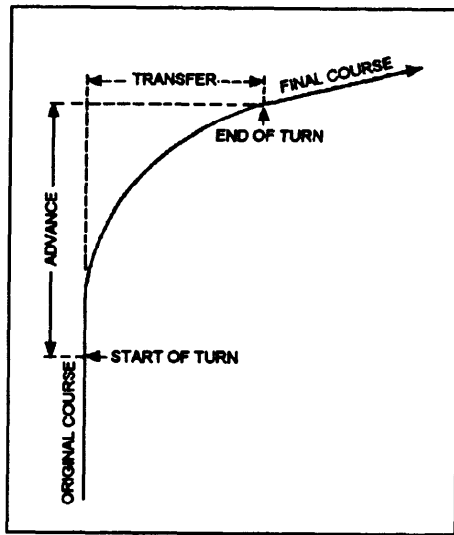
Turn Bearings and Ranges

Turn bearings and ranges indicate the instant at which the rudder is put over to execute a left or right turn. Turn bearings and ranges are created by using the advance and transfer quantities (see fig. 12-4) of your ship's handling characteristics to plot a point on your track to which a bearing line or range arc is laid to a prominent NAVAID. A lighted NAVAID is best for day and night versatility for bearing lines only. The NAVAID should be as nearly perpendicular to the ship's track as possible. In narrow channels or tight turns the ship's transfer quantity must be closely considered when laying the turn bearing or range arc. See figure 12-5.

Turn ranges present a few differences from turn bearings. The turn range is an arc segment and should be identified' on the primary chart by a unique color or plotted only on the CIC secondary plot chart. If the use of turn ranges is necessary, for example, fog restricted visibility, the navigator will normally shift his or her station to the CIC secondary plot.

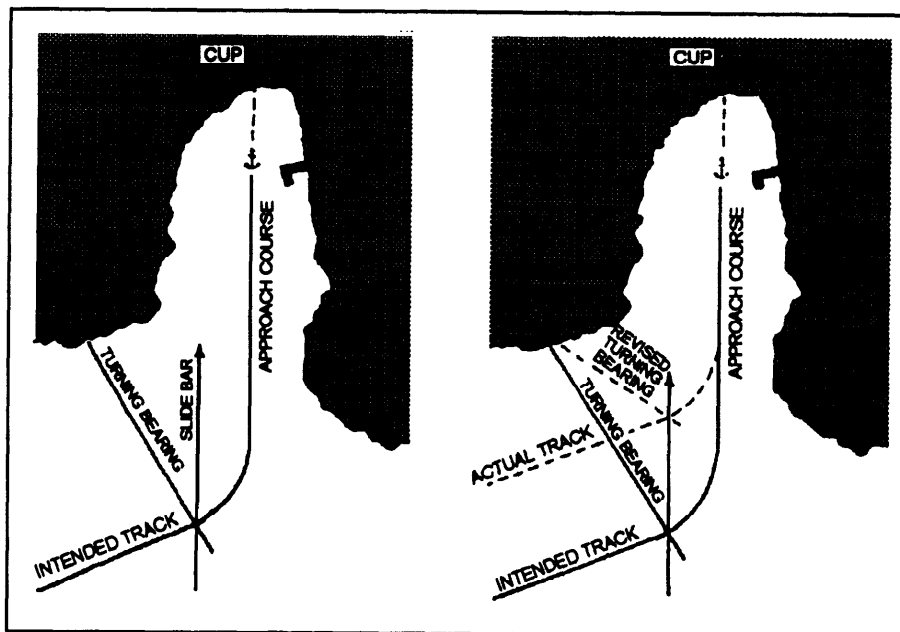
The *slide bar technique* is accomplished by paralleling the next intended course to the ship's actual course. By doing this, the turn bearing can be easily revised as shown in figure 12-5.

Planning and Constructing Restricted Water Tracks, continued



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Figure 12-4. Advance and transfer.



26NVM103

Figure 12-5. Turn bearings and slide bar technique.

Planning and Constructing Restricted Water Tracks, Continued

Danger Bearings A danger bearing is used by the navigator to keep the ship clear of an outlying area of danger close to where the ship must pass. In all probability, a danger area has been previously surveyed and is plotted on the chart, but, in the vast majority of cases, it will give no warning of its presence to the eye. Examples of such dangers are submerged rocks, reefs, wrecks, and shoals. A danger bearing must be established between two fixed objects, one of which is the danger area. The other object must be selected to satisfy the following conditions: (1) It must be visible to the eye; (2) it must be indicated on the chart; and (3) true bearing from the danger area should be in the same general direction as the course of the ship as it proceeds past the danger.

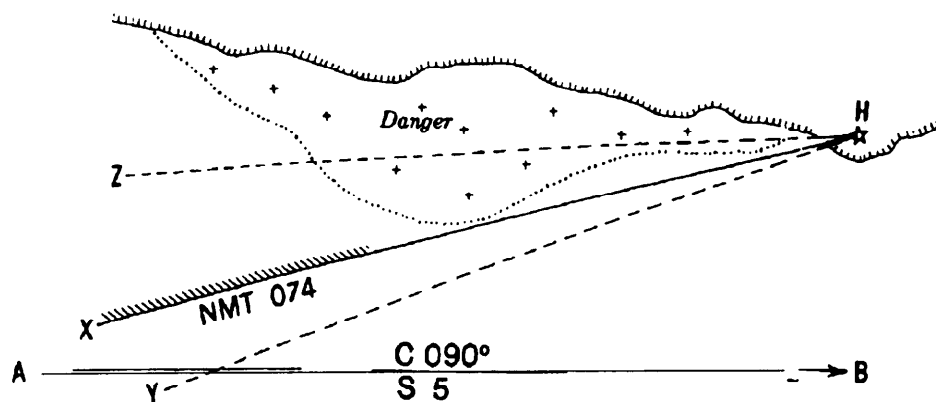


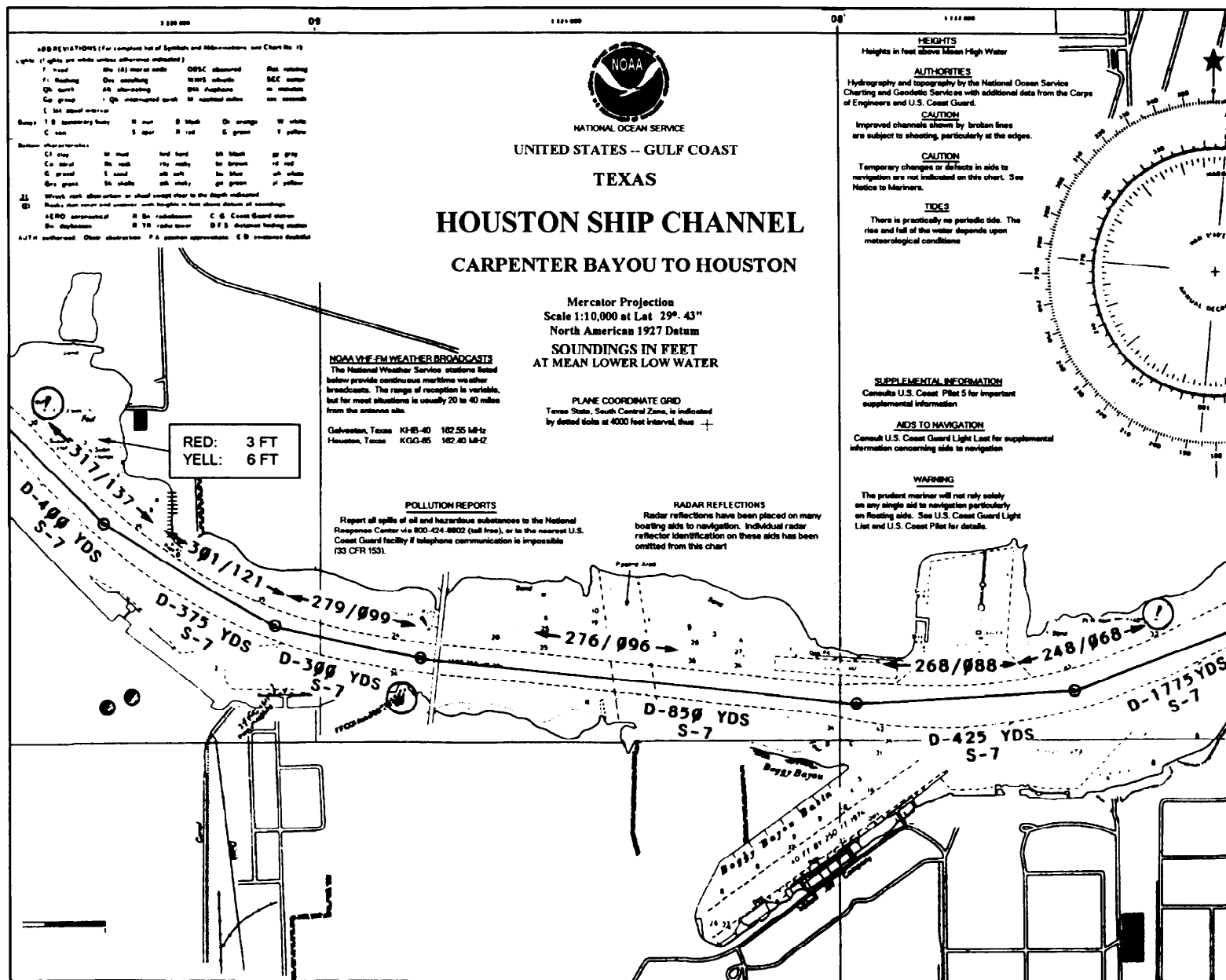
Figure 12-6. Example of a danger bearing.

As shown in figure 12-6, a ship is proceeding along a coast on an intended track of 090°T at a speed of 5 knots (line AB). A shoal on the port side is to be avoided. A line is drawn from lighthouse H, tangent to the outer edge of the danger (line HX). As long as the bearing of lighthouse H is *less* than line HX (the danger bearing), the ship is in safe water. The danger bearing in this illustration is 074°T . You will notice that the danger side of the danger bearing is hatched. The danger bearing is also labeled with NMT (meaning NOT MORE THAN). An example of a bearing to lighthouse H that would indicate that the ship is in safe water is the broken line YH. No part of this bearing line passes through the danger area. Any bearing *greater* than the danger bearing (line HX), such as the broken line ZH, indicates a possible dangerous situation. If the danger area is being passed on the port side, as in this illustration, the safe bearing is less than the danger bearing. Danger angles are not normally used; however, you should use Pub 9, *Bowditch*, to learn more about using them.

Planning and Constructing Restricted Water Tracks, Continued

Constructing the Restricted Water Track In the following table, you'll find all of the steps listed to construct the restricted water track. This list assumes that all information has been obtained about the port.

Step	Action
1.	Mark all red and yellow soundings.
2.	<p>Lay down intended tracks. Normally, the intended track is laid down in the middle of the channel (see fig. 12-7). The only exceptions are very wide channels with mid-channel buoys where the track is laid in the center of one-half of the channel.</p> <p>Turn points are normally established by the intersection of two course lines that have been laid for different legs of the track.</p>
3.	Label all courses, speeds, and distances.
4.	Check for hidden dangers; construct danger bearings if necessary.
5.	Create turn bearings for each turn. Remember to use lighted NAVAIDs where possible.
6.	Highlight all NAVAIDs and radar points; record in the Standard Bearing Book.
7.	<p>On several areas of the overall track, display forecasted wind and current data. This may done by drawing arrows that point in the direction of wind or current with the force labeled. Alternately, you may cut out arrows labeled with the information and then use tape to stick the arrows to the chart.</p> <p>Note: On larger deep draft vessels, 1 knot of current can equal about the same as 10 knots of wind. Strong winds along with 1 knot or more of current may make larger vessels crab up a channel.</p>



Precision Anchoring

Selecting an Anchorage

An anchorage position in most cases is specified by higher authority. Anchorages for most ports are assigned by the local port authority in response to individual or joint requests for docking or visit. Naval ships submit a port visit (PVST) request letter or logistic requirement (LOGREQ) message well in advance of the ship's scheduled arrival date. Operational anchorages in areas outside the jurisdiction of an established port authority are normally assigned by the senior officer present afloat (SOPA) for ships under his or her command.

If a ship is steaming independently and is required to anchor in other than an established port, the selection of an anchorage is usually made by the navigator and then approved by the commanding officer. In all cases, however, regardless of whether the anchorage is selected by higher authority or by the navigator, the following conditions should always apply insofar as possible:

- The anchorage should be at a position sheltered from the effects of strong winds and current.
- The bottom should be good holding ground, such as mud or sand rather than rocks or reefs.
- The water depth should be neither too shallow, hazarding the ship, nor too deep, facilitating the dragging of the anchor.
- The position should be free from such hazards to the anchor cable as fish traps, buoys, and submarine cables.
- The position should be free from such hazards as shoals and sandbars.
- There should be a suitable number of landmarks, daymarks, and lighted NAVAIDs available for fixing the ship's position both by day and by night.
- If boat runs to shore are to be made, the anchorage chosen should be in close proximity to the intended landing.

Precision Anchoring, Continued

Selecting an Anchorage

Even when an anchorage has been specified by higher authority, the commanding officer is ultimately responsible for the safety of the ship. The commanding officer has the choice of refusing to anchor at the location assigned if he or she judges it to be unsafe. In these circumstances, the commanding officer should request an alternate location less exposed to hazards.

Many of the coastal charts of the United States and its possessions drawn up by the National Ocean Survey contain colored anchorage circles and anchor symbols of various sizes for different types of ships.

The circles are located on the chart in those areas best suited for anchoring, taking into account the factors listed above. These circles and symbols are lettered and numbered, allowing a particular berth to be specified. Foreign charts often have anchorage areas specified as well. Amplifying information on possible anchorage sites can be obtained from the applicable volume of the *Coast Pilots*, for U.S. waters; from the proper volume of the *En-Route Sailing Directions*, for foreign waters; and from the *Fleet Guide*, for ports in foreign or domestic waters frequented by U.S. Navy ships.

When it is desired to anchor at a location other than that shown as an anchorage berth on a chart, the anchorage is normally specified by giving the range and bearing to it from a charted reference point, along with the radius of the berth.

Precision Anchoring, Continued

Terms

Associated With Anchoring

After the anchorage position has been determined, the navigator is ready to begin plotting the anchorage. In so doing, reference is often made to the following terms:

Term	Definition
Approach track	This is the track along which the ship must proceed in order to arrive at the center of the anchorage. Its length will vary from 2,000 yards or more for a large ship to 1,000 yards for a ship the size of a Navy destroyer or smaller. Under most circumstances, it should never be shorter than 1,000 yards.
Head bearing	If at all possible, the navigator selects an approach track such that a charted NAVAID will lie directly on the approach track if it were extended up to the aid selected. The bearing to the aid thus described is termed the head bearing; it should remain constant if the ship is on track during the approach.
Letting-go circle	This is a circle drawn around the intended position of the anchor at the center of the berth, with a radius equal to the horizontal distance from the hawsepipe to the pelorus.
Letting-go bearing	Sometimes referred to as the drop bearing, this is a predetermined bearing drawn from the intersection of the letting-go circle with the approach track to a convenient landmark or NAVAID, generally selected near the beam.
Range circles	These are preplotted semicircles of varying radii centered on the center of the anchorage, drawn so that the areas are centered on the approach track. Each is labeled with the distance from that arc to the letting-go circle.
Swing circle	This is a circle centered at the position of the anchor, with a radius equal to the sum of the ship's length plus the length of chain let out.
Drag circle	<p>This is a circle centered at the final calculated position of the anchor, with a radius equal to the sum of the hawsepipe to pelorus distance and the final length of chain let out. All subsequent fixes should fall within the limits of the drag circle.</p> <p>Note: The actual radii of both the swing and drag circles will in reality be less than the values used by the navigator in plotting them on the chart, because the catenary of the chain from the hawsepipe to the bottom is disregarded. Thus, a built-in safety factor is always included in the navigator's plot.</p>

Precision Anchoring, Continued

Before Constructing the Anchorage Before constructing the anchorage plot, it is always wise to draw a swing circle of estimated radius around the designated anchorage site to check whether any charted hazards will be in close proximity to the ship at any time as it swings about its anchor. If any such known hazards are located either within or near the swing circle, an alternate anchorage should be requested.

If the anchorage appears safe, the navigator begins the anchorage plot by selecting the approach track. During this process, due regard must always be given to the direction of the predicted wind and current expected in the vicinity of the anchorage. Insofar as possible, the approach should always be made directly into whichever of these two forces is predicted to be strongest at the approximate time at which the anchorage is to be made.

Constructing the Anchorage Use the following table to construct an anchorage:

Step	Action
1.	<p>Select the approach track by considering the different objects available for a head bearing, taking into account the expected winds and current in the bay. Assuming negligible current and a northerly wind, the tower in figure 12-8 is a good choice for a head bearing.</p> <div data-bbox="586 1208 1252 1659"><p>The diagram illustrates a bay area for anchorage. At the top, a scale bar is marked from 0 to 500 yards in increments of 100. A north arrow points upwards. Several objects are marked with circles and labels: 'TANK' on the left, 'TR. CR.' (likely a tower) in the center, 'W-5' below the center tower, another 'TR. CR.' further up, and 'STACK' on the right. A thick, dark, S-shaped line represents the approach track, starting from the left, curving around the 'TANK' and 'TR. CR.' area, and then extending towards the right. The label '28NVM105' is located at the bottom right of the diagram.</p></div> <p>Figure 12-8. W-5 anchorage assignment.</p>

Precision Anchoring, Continued

Step	Action
2.	Lay out and label the approach track (minimum of 1,000 yd) and label as shown in figure 12-9.
3.	Lay out and label the intended track that will intercept the approach track.
4.	Lay out and label the turn bearing for the turn onto the approach track. In figure 12-9, a turn bearing of 345° on the tank is used.
5.	Lay out the letting-go circle; remember that the radius of this circle is equal to the distance from the pelorous to the hawsepipe.
6.	Lay out and label the letting-go bearing (LGB). In figure 12-9, a LGB of 096° is constructed using the stack.
7.	Lay out range to anchorage distance arcs beginning at the edge of the letting-go circle. Use 100-yard increments out to 1,000 yards and then also at 1,200, 1,500, and 2,000 yards, as shown in figure 12-9.

28NVM107

Figure 12-9. The completed anchorage track.

Precision Anchoring, Continued

Executing the Anchorage

When executing the actual anchorage, the navigator's dual objective is to keep the ship as near as possible on its preplanned approach track and to have all headway off the ship when the hawsepipe is directly over the center of the anchorage. As mentioned above, the navigator obtains frequent fixes as the ship proceeds along its track, and keeps the bridge continually informed as to the position of the ship in relation to the track and the letting-go circle. The navigator recommends courses to get back onto track if necessary. Since every ship has its own handling characteristics, speeds that should be ordered as the ship proceeds along the track are difficult to specify. In general, however, with 1,000 yards to go, most ships usually slow to a speed of 5 to 7 knots. Depending on wind and current, engines should be stopped when about 300 yards from the letting-go circle, and the anchor detail should be instructed to "stand by." As the vessel draws near the drop circle, engines are normally reversed so as to have all remaining headway off the ship as it passes over the letting-go circle. When the pelorus is exactly at the letting-go bearing, the word "Let go the anchor" is passed to the anchor detail, and the anchor is dropped.

As the anchor is let go, the navigator should immediately call for a round of bearings to be taken, and he or she should record the ship's head. After the resulting fix is plotted, a line is extended from it in the direction of the ship's head, and the hawsepipe to pelorus distance is laid off along the line, thus plotting the position of the anchor at the moment that it was let go. If all has gone well, the anchor should have been placed within 50 yards of the center of the anchorage.

Post Anchoring Procedure

After the anchor has been let go, the chain is let out or "veered" until a length or "scope" of chain 5 to 7 times the depth of water is reached. At this point, the chain is secured and the engines are backed, causing the flukes of the anchor to dig into the bottom, thereby "setting" the anchor.

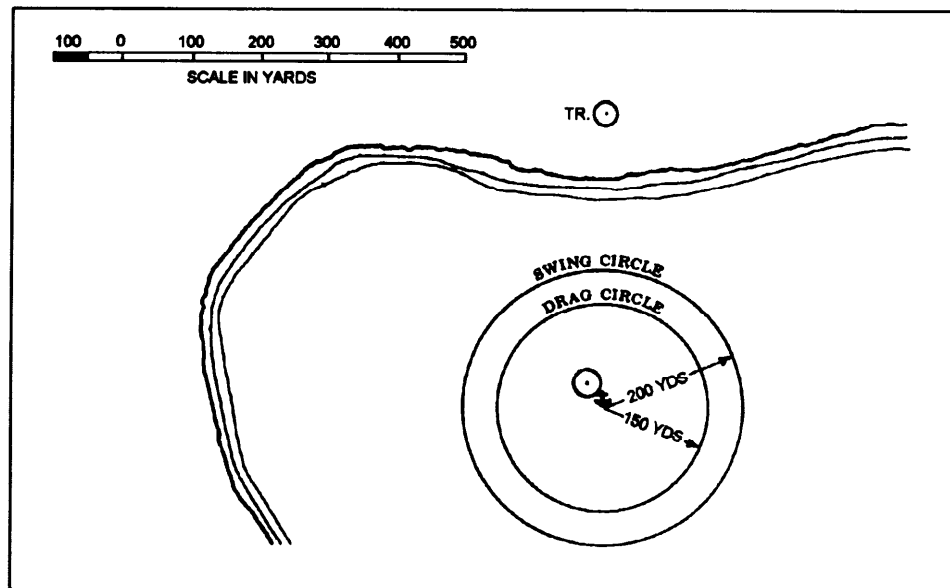
When the navigator receives the word that the chain has been let out to its full precomputed length and that the anchor appears to be holding round of bearings and the ship's head, as well as the direction in which the chain is tending. With this information, the navigator plots another fix and recomputes the position of the anchor by laying off the sum of the hawsepipe to pelorus distance plus the scope of chain in the direction in which the chain is tending. This second calculation of the position of the anchor is necessary because it may have been dragged some distance from its initial position during the process of setting the anchor.

Precision Anchoring, Continued

Post Anchoring Procedure, continued

After the final position of the anchor has been determined, the navigator then draws a second swing circle. This time the navigator uses the computed position of the anchor as the center, and the sum of the ship's length plus the actual scope of chain let out as the radius. If any previously undetermined obstruction, such as a fishnet buoy or the swing circle of another ship anchored nearby, is found to lie within this circle, the ship may have to weigh anchor and move away from the hazard. If the ship is anchored in a designated anchorage area, due care should be taken to avoid fouling the area of any adjacent berths, even though they might presently be unoccupied. If the swing circle intersects another berth, it may be necessary to take in some chain to decrease the swing radius; if this is not possible, a move to a larger berth may be advisable.

If the navigator is satisfied that no danger lies within the swing circle, he or she then draws the drag circle concentric with the swing circle, using as a radius the sum of the hawsepipe to pelorus distance plus the scope of chain. All fixes subsequently obtained should fall within the drag circle; if they do not, the anchor should be considered to be dragging. Both the swing circle and the drag circle are shown in figure 12-10, assuming that a scope of chain of 50 fathoms to the hawsepipe has been let out.



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Figure 12-10. Swing and drag circles.

Precision Anchoring, Continued

Post Anchoring Procedure, continued

After plotting the drag circle, the navigator then selects several lighted NAVAIDs suitable for use in obtaining fixes by day or night and enters them in the bearing book for use by the anchor-bearing watch. The anchor-bearing watch is charged with obtaining and recording in the bearing book a round of bearings to the objects designated by the navigator at least once every 15 minutes, and plotting the resulting fix on the chart each time. Should any fix fall outside the drag circle, another round of bearings is immediately obtained. If the second fix also plots outside of the drag circle, the ship is considered to be dragging anchor and all essential personnel are notified. In practice, if the ship is to be anchored for any length of time, the navigator will usually have the anchor watch cover the area of the chart containing the drag circle with a sheet of semiclear plastic. This is done so the chart will not be damaged by the repeated plotting and erasures of fixes within the drag circle.

When a ship is dragging anchor, especially in high wind conditions, there is often no unusual sensation of ship's motion or other readily apparent indication of the fact. The safety of the ship depends on the ability of the anchor watch to accurately plot frequent fixes and to alert all concerned if they begin to fall outside the drag circle. If conditions warrant, the ship may have to get under way. As interim measures to be taken while the ship is preparing to do this, more chain may be veered to increase the total weight and catenary of chain in the water, and a second anchor may be dropped if the ship is so equipped.

Situations in which high winds are forecast, the ship should assume an increased degree of readiness, with a qualified conning officer stationed on the bridge, and a skeleton engineering watch standing by to engage the engines if necessary. As an example, during a Caribbean cruise a U.S. Navy submarine was anchored off St. Thomas, V.I., in calm waters with less than 5 knots of wind blowing. Because high winds had been forecast for later in the night, the OOD was stationed on the bridge, and a skeleton engineering watch was charged with keeping the engines in a 5-minute standby condition. Two hours after anchoring, after the liberty sections had gone ashore, the wind began to increase. In the next 45 minutes, wind force increased to the point where 55-knot gusts were being recorded. The ship got under way and steamed throughout the night until the storm abated the next day. For additional information on anchoring, types of anchors, and anchoring gear, refer to *Naval Ships' Technical Manual*, chapter 581, titled "Anchors and Anchoring."

The Navigation Brief

Purpose

The purpose of the navigation brief is to provide a standard procedure that all ships follow prior to getting under way or entering port. The briefing is presented by the navigator to the commanding officer and all key personnel and provides a forum for discussion of the anticipated ship movement. The joint Commander Naval Surface Forces Atlantic and Pacific Instruction 3530.2, *Navigation Standards and Procedures*, provides specific guidance on the minimum requirements of the contents of the navigation briefing.

Content

The following table lists items that may be found on the navigation brief and is meant for illustrative purposes only. Do not rely solely on this table but rather the joint instruction 3530.2 when constructing a navigation briefing.

Item	Description
Watch Assignments	All key individuals are identified by name; for example, the OOD, JOOD, EOOW, CICWO, and helm safety officer.
Charts	All charts and tracks are reviewed. Information briefed includes items such as course and speed of each leg, all dangers and hazards, NAVAIDs, port requirements, demarcation lines, emergency anchorages, and turn bearings.
Engineering	The status of the engineering plant is reported.
Navigation Equipment	The status of all navigation equipment is reported.
Environmental Conditions	Tide and current data is briefed for each leg of the transit. Forecasted weather is briefed.
Pilot and Tugs	Pilot pickup or drop off is briefed along with the number of tugs anticipated.

Construction

The actual construction of the navigation brief varies from ship to ship. Some ships use preapproved forms while others use word processors or data bases to construct a navigation brief. For either case the senior Quartermaster and the navigator usually gather all required information for the navigation briefing.

Preparing to Depart Port

Standard Checklist

Use the following standard checklist to prepare to depart port. The items listed may be modified as necessary by individual ships.

Time prior	Action
48 hours	Establish getting under way schedule to cover propulsion plant light off, shift from shore to ship's power, last boat run, rigging in of accommodation ladder, disposal of ship's vehicles, light off and testing of electronics suite, and U.S. and guard mail. Release MOVEREP.
24 hours	Conduct navigation brief. Verify arrangements for tugs/pilot. Compare bridge and CIC charts. Conduct steering system PMS. Verify schedule for lighting off power plant. Check navigation lights for proper operation. Verify arrangements for running the degaussing range. Ascertain scheduled ship movements.
8 hours	Energize gyrocompass. Energize and calibrate all radar repeaters. Energize and initialize all electronic navigation equipment.
4 hours	Determine gyro error. Confirm tugs/pilot/line handlers.
3 hours	Verify arrangements for discontinuance of shore services.

Preparing to Depart Port, Continued

Time prior	Action
2 hours	<p>Find out from the XO:</p> <ol style="list-style-type: none"> 1. If any variation in standard sequence of stationing special sea and anchor detail exists. 2. Time of heaving in to short stay or singling up lines. 3. Disposition of boats and vehicles. 4. Instructions concerning U.S. and guard mail. 5. Number of passengers and expected time of arrival. <p>After obtaining permission from the executive officer, start hoisting boats and vehicles as soon as no longer required.</p> <p>After obtaining permission from the executive officer, rig in booms and accommodation ladders not in use and secure for sea.</p> <p>Promulgate under way time to all hands.</p> <p>Energize all radars except those prohibited by local electromagnetic emission restrictions.</p> <p>Conduct radio checks on all required circuits. (Include bridge-to-bridge RT.)</p>
1 1/2 hours	<p>Muster the crew.</p> <p>Shift into the uniform of the day, if applicable.</p>
1 hour	<p>Set condition YOKE.</p> <p>Clear ship of visitors.</p> <p>MAA inspect for stowaways.</p> <p>Tune and peak radars.</p> <p>Ensure cleanliness of pier.</p> <p>Ensure that the pit sword is in raised position, if applicable.</p>

Preparing to Depart Port, Continued

Time prior	Action
45 min	<p>Station the special sea and anchor detail.</p> <p>In reduced visibility: (1) station the low visibility detail; and (2) set material condition ZEBRA on the main deck and below.</p> <p>Make reports to DCC.</p> <p>Embark pilot. Display CODE HOTEL.</p> <p>Prepare anchor for letting go.</p> <p>Test anchor windlass.</p> <p>OOD shift watch to the bridge.</p> <p>Conduct loss of steering drill.</p> <p>Test sound-powered phone circuits in use.</p> <p>Post tide/current/NAVAID information on the bridge and CIC.</p> <p>Receive departmental reports for readiness to get under way.</p> <p>MAA make report of inspection for stowaways.</p> <p>Record draft of ship fore and aft in ship's deck log, if applicable.</p> <p>Raise deck edge antennas, if required.</p>
15 min	<p>Obtain commanding officer's permission to test main engine(s) and direct engineering control accordingly after ensuring that the screw(s) is/are clear.</p> <p>Test ship's whistle and general alarms.</p> <p>If alongside a pier, ensure that all shore connections are broken and that the brows are ready to be removed.</p> <p>Single up lines when so ordered.</p> <p>Conduct time check throughout the ship.</p> <p>Report when ready for getting under way to the executive officer.</p>
10 min	<p>Order maneuvering bells by setting the engine revolution indicator system on a certain repetitive number combination beyond the range of the engines, such as "999", if applicable.</p> <p>Warn engineering control to stand by to answer all bells.</p> <p>If a flag officer or unit commander is embarked, request permission to get under way as scheduled.</p>
ZERO	Under way.
After U/W	<p>Shift colors/close up international call sign.</p> <p>When clear of restricted waters, lower pit sword.</p> <p>When clear of restricted waters, conduct loss of steering drill.</p> <p>Advise CO when entering international waters and haul down international call sign.</p>

Preparing to Enter Port or Restricted Waters

Standard Checklist

Use the following standard checklist to prepare to enter port or restricted waters. The items listed may be modified as necessary by individual ships.

Time prior	Action
24 hours	Conduct navigation plan brief. Ensure CIC and bridge chart tracks are the same.
When Directed	Dump all trash and garbage overboard. Pump bilges when conditions permit. Blow tubes if required. Raise the pit log. Ensure the smart appearance of the ship.
3 hours	Ascertain the expected time of anchoring or mooring from the navigator, and notify the engineer officer, weapons officer, first lieutenant, and EOOW.
1 hour	Pass the word, MAKE ALL PREPARATIONS FOR ENTERING PORT. THE SHIP WILL ANCHOR (MOOR ____ SIDE TO) AT ABOUT _____. ALL HANDS SHIFT INTO THE UNIFORM OF THE DAY. Weather permitting, remove such canvas covers as are normally off when in port. Obtain information concerning boating from the XO; inform the first lieutenant. Lay out mooring lines if required. Set up and check all harbor and tug frequencies. Test ship's whistle and general alarms. Station the navigation detail. Conduct time check throughout the ship.
45 min	Pass the word GO TO YOUR STATIONS, ALL THE SPECIAL SEA AND ANCHOR DETAIL. Have anchor ready for use when appropriate. Determine and record fore and aft draft of the ship. Prior to approaching restricted waters, conduct a loss of steering drill. Hoist international call sign when entering inland waters.

Preparing to Enter Port or Restricted Waters, Continued

Time prior	Action
30 min	Obtain information from navigator on depth of water at anchorage, anchor and scope to be used, and inform first lieutenant. Receive readiness reports for entering port. Request permission to enter port from the proper authority. When mooring to a pier, inform first lieutenant as to the range of tide and the time of high water. Station line handlers.
20 min	When required, designated personnel fall in at quarters for entering port. Direct CMAA to inspect upper decks to see that crew is in proper uniform.
15 min	Station in-port deck watches. If mooring to a buoy, lower motor whaleboat with buoy detail as directed. Stand by to receive tugs and pilots.
Upon mooring	Secure main engines, gyros, and navigational radars as directed. If anchored, obtain navigation bearings and determine swing circle.

Conclusion

This concludes the Quartermaster rate training manual. Hopefully, you have learned a great deal about your job and of navigation in general. You are strongly encouraged to continue a strive for excellence in your search for additional knowledge of navigation and shiphandling. As mention in the preface of this RTM, the material you have covered meets only the minimum occupational requirements for the QM. Don't stop here, continue to learn and by all means pass your knowledge on to junior personnel who, with proper guidance, will continue to become the trusted navigation advisors in the fleet.